APPENDIX A

1. A method of manufacturing a polyisocyanurate foam insulation board, the method comprising:

contacting a stream of reactants that comprise an isocyanate-reactive compound with a stream of reactants that include an isocyanate compound to form a reaction product, where said step of contacting takes place in a mix head in the presence of a blowing agent and air, where the blowing agent is selected form the group consisting of alkanes, (cyclo)alkanes, hydrofluorocarbons, hydrochlorofluorocarbons, fluorocarbons, fluorinated ethers, alkenes, alkynes and noble gases; and

adding an effective amount of the air in the stream of reactants comprising the isocyanate-reactive compound, or the stream of reactants including the isocyanate compound, or both, to increase the volume of developing foam as it instantaneously leaves the mix head prior to the time any blowing agent that relies on a heat of reaction to expand can contribute to any foaming process under atmospheric pressure by at least 1.25.

2-29 Cancelled

30. The method of claim 42, where the effective amount of air is dissolved in the stream including the isocyanate-reactive compound to increase the volume of developing foam as it instantaneously leaves the mix head, prior to the time any blowing agent that relies on a heat of reaction to expand can contribute to any foaming process, by at least 1.5.

31. The method of claim 42, where the effective amount of air is dissolved in the stream including the isocyanate-reactive compound to increase the volume of developing foam as it instantaneously leaves the mix head, prior to the time any blowing agent that relies on a heat of reaction to expand can contribute to any foaming process, by at least 1.75.

32. The method of claim 42, where the blowing agent includes n-pentane, isopentane, cyclopentane, and mixtures thereof.

33. The method of claim 32, where the blowing agent is devoid of hydrofluorocarbons and hydrochlorofluorocarbons.

34. A method for making polyisocyanurate foams, the method comprising:

providing an A-side stream of reactants that include an isocyanate to a mix head;

providing a B-side stream of reactants that include a isocyanate reactive component and a blowing agent selected from the group consisting of alkanes, (cyclo)alkanes, hydrofluorocarbons, hydrochlorofluorocarbons, fluorocarbons, fluorinated ethers, alkenes, alkynes and noble gases to the mix head;

adding an effective amount of nitrogen to the A-side or B-side stream of reactants, to increase the volume of developing foam as it instantaneously leaves the mix head, prior to the time any blowing agent that relies on a heat of reaction to expand can contribute to any foaming process, under atmospheric pressure by at least 1.25.

35. The method of claim 47, where the effective amount of nitrogen is added to the B-side stream of reactants to increase the volume of the developing foam as it instantaneously leaves the mix head, prior to the time any blowing agent that relies on a heat of reaction to expand can contribute to any foaming process, by at least 1.5.

36. The method of claim 35, where the effective amount of nitrogen is added to the B-side stream of reactants to increase the volume of the developing foam as it instantaneously leaves the mix head, prior to the time any blowing agent that relies on a heat of reaction to expand can contribute to any foaming process, by at least 1.75.

37. The method of claim 47, where the blowing agent includes n-pentane, isopentane cyclopentane, and mixtures thereof.

38. The method of claim 37, where the blowing agent is devoid of hydrofluorocarbons and hydrochlorofluorocarbons.

39. A method for making polyisocyanurate foams, the method comprising:

providing an A-side stream of reactants that include an isocyanate;

providing a B-side stream of reactants that include (i) an isocyanate reactive component selected from the group consisting of polyols and mixtures thereof, and (ii) a blowing agent selected from the group consisting of alkanes, (cyclo)alkanes, hydrofluorocarbons, hydrochlorofluorocarbons, fluorocarbons, fluorinated ethers, alkenes, alkynes and noble gases, where an excess of isocyanate to isocyanate reactive component is employed so as to produce a polyisocyanurate foam;

adding an effective amount of nitrogen to the A-side or B-side stream of reactants to increase the volume of developing foam as it instantaneously leaves the mix head under atmospheric pressure by at least 1.25, prior to the time any blowing agent that relies on a heat of reaction to expand can contribute to any foaming process; and

contacting the A-side and B-side streams of reactants in a mix head at a temperature of about 29 °C to about 35 °C and a pressure of about 1800 psi to 2400 psi.

40. The method of claim 39, where the effective amount of nitrogen is added to the B-side stream of reactants to increase the volume of developing foam as it instantaneously leaves the mix head, prior to the time any blowing agent that relies on a heat of reaction to expand can contribute to any foaming process, by at least 1.5.

41. Cancelled

42. The method of claim 1, where the streams of reactants are contacted in the mix head at a pressure of about 1800 psi to 2400 psi.

43. The method of claim 42, further comprising the step of depositing the developing foam on a laminator.

44. The method of claim 43, where the developing foam is continuously deposited on the laminator.

45. The method of claim 43, where the developing foam is deposited on the laminator such that a proportionally greater amount is deposited near the edges of the board.

46. The method of claim 1, where the A-side isocyanate is selected from the group consisting of diphenyl methane, diisocyanate, diphenyl methane diisocyanates and toluene diisocyanate, or mixtures thereof.

47. The method of claim 34, where the A-side and B-side streams of reactants are contacted in the mix head at a pressure of about 1800 psi to 2400 psi.

48. The method of claim 47, further comprising the step of depositing the developing foam on a laminator.

49. The method of claim 48, where the developing foam is continuously deposited on the laminator.

50. The method of claim 48, where the developing foam is deposited on the laminator such that a proportionally greater amount is deposited near the edges of the board.

51. The method of claim 34, where the A-side isocyanate is selected from the group consisting of diphenyl methane, diisocyanate, diphenyl methane diisocyanates and toluene diisocyanate, or mixtures thereof.

52. The method of claim 39, where the effective amount of nitrogen is added to the B-side stream of reactants to increase the volume of the developing foam as it instantaneously leaves the mix head, prior to the time any blowing agent that relies on a heat of reaction to expand can contribute to any foaming process, by at least 1.75.

53. The method of claim 39, where the blowing agent includes n-pentane, isopentane, cyclopentane, and mixtures thereof.

54. The method of claim 53, where the blowing agent is devoid of hydrofluorocarbons and hydrochlorofluorocarbons.

55. The method of claim 39, where the developing foam is continuously deposited on the laminator.

56. A method of manufacturing a polyisocyanurate foam insulation board including continuously contacting a stream of reactants that comprise an isocyanate-reactive compound with a stream of reactants that include an isocyanate compound in a mix head to form a developing foam reaction product, and continuously depositing the developing foam on a facer in a laminator, the method comprising:

introducing an effective amount of an inert gas having a boiling point of less than 20°C into the stream of reactants including the isocyanate-reactive compound or the stream of reactants including the isocyanate compound, or both, where the stream of reactants including the isocyanate-reactive compound and the stream of reactants including the isocyanate compound are continuously contacted in the presence of a blowing agent, where the blowing agent is selected form the group consisting of alkanes, (cyclo)alkanes, hydrofluorocarbons, hydrochlorofluorocarbons, fluorocarbons, fluorinated ethers, alkenes, alkynes and noble gases, to increase the volume of developing foam as it instantaneously and continuously leaves the mix head, prior to the time any blowing agent that relies on a heat of reaction to expand can contribute to any foaming process, under atmospheric pressure by at least 1.25.

57. The method of claim 56, where the A-side and B-side streams of reactants are contacted in the mix head at a temperature of about 29 °C to about 35 °C and a pressure of about 1800 psi to 2400 psi.

58. The method of claim 57, where the inert gas has a boiling point of less than 10°C.

59. The method of claim 58, where the inert gas has a boiling point of about -1° C.

60. The method of claim 57, where the effective amount of inert gas is added to the stream of reactants including the isocyanate-reactive compound to increase the volume of the developing foam as it instantaneously and continuously leaves the mix head, prior to the time any blowing agent that relies on a heat of reaction to expand can contribute to any foaming process, by at least 1.5.

61. The method of claim 60, where the effective amount of inert gas is added to the stream of reactants including the isocyanate-reactive compound to increase the volume of the developing foam as it instantaneously and continuously leaves the mix head, prior to the time any blowing agent that relies on a heat of reaction to expand can contribute to any foaming process, by at least 1.75.

62. The method of claim 61, where the blowing agent includes n-pentane, isopentane, cyclopentane, and mixtures thereof.

63. The method of claim 57, where the developing foam is deposited on the laminator such that a proportionally greater amount is deposited near the edges of the board.

64. A method for making polyisocyanurate foams, the method comprising:
providing an A-side stream of reactants including an isocyanate to a mix head;

providing a B-side stream of reactants that include a isocyanate-reactive component and a blowing agent selected from the group consisting of alkanes, (cyclo)alkanes, hydrofluorocarbons, hydrochlorofluorocarbons, fluorocarbons, fluorinated ethers, alkenes, alkynes and noble gases to the mix head; and

adding an effective amount of an inert gas having a boiling point of less than 20 °C to the A-side or B-side stream of reactants, where said gas is inert to said A-side stream of reactants and said B-side stream of reactants, to increase the volume of developing foam as it instantaneously leaves the mix head, prior to the time any blowing agent that relies on a heat of reaction to expand can contribute to any foaming process, under atmospheric pressure by at least 1.25,

where the A-side and B-side streams of reactants are contacted in the mix head at a temperature of about 29 °C to about 35 °C and a pressure of about 1800 psi to 2400 psi.

65. (Canceled)

66. The method of claim 65, where the inert gas has a boiling point of less than 10° C.

67. The method of claim 66, where the inert gas has a boiling point of about -1° C.

68. The method of claim 67, where the inert gas has a boiling point of less than -18° C.

69. The method of claim 56, where the developing foam is frothy.